LCEC
LEBANESE CENTER FOR ENERGY CONSERVATION
المركز اللبناني لحفظ الطاقة

LEA (THE LEBANESE ENVIRONMENTAL ACTION)

Prepared by the Technical Support Unit to BDL at the LCEC - March 2016

A Guidance Document for

WASTEWATER TREATMENT PLANT

INTRODUCTION

The purpose of a wastewater treatment plant is to treat and remove contaminants from the wastewater that is generated from domestic, commercial or industrial point sources, in order to reduce pollutants and meet applicable environmental standards before being discharged to the environment.

Application:

Wastewater is water generated from homes, businesses and industries and includes human waste, oils, soaps, and chemicals. It is transported via the sewerage network to a wastewater treatment plant that uses combinations of technologies to screen, settle, treat and biologically remove pollutants to protect water bodies. The application of a wastewater treatment plant can extend from residential, commercial to institutional and industrial uses.

Types of treatments:

A wastewater treatment plant generally has three broad types. The degree of treatment depends upon the characteristics of influent as well as the required effluent characteristics.

Treatment processes are often classified as:

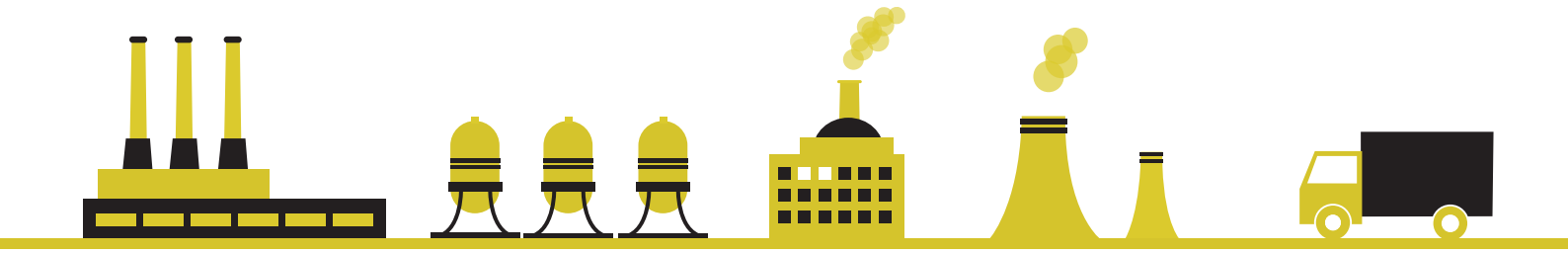
1. Preliminary treatment
2. Primary treatment
3. Secondary treatment
4. Tertiary treatment

Parameters that affect the wastewater quality:

The composition of wastewater is a function of the uses to which the water was submitted. The uses and the form with which they were exercised vary with climate, social and economic situations as well as population habits.

Domestic or sanitary wastewater contains organic and inorganic matter, suspended and dissolved solids, in addition to microorganisms.

Discharges by industries and commercial enterprises differs from time to time and from industry to industry. The industrial wastewater composition depends on the type and size of the industry, manufacturing processes, existence of pre-treatment, etc. Industrial discharges can residual acids, trace elements, heavy metals, and toxic chemicals.



REQUIREMENTS

Sewerage network required information:

1 Software used to design the sewers system taking into account the following:

a- Gravity and pressure;

b- Hydraulics analysis;

c- Wastewater loading;

d- Infiltration and inflow allocation and estimation;

e- Design of new systems as well as rehabilitation of existing sanitary sewers, if any.

f- Comprehensive Scenario Management;

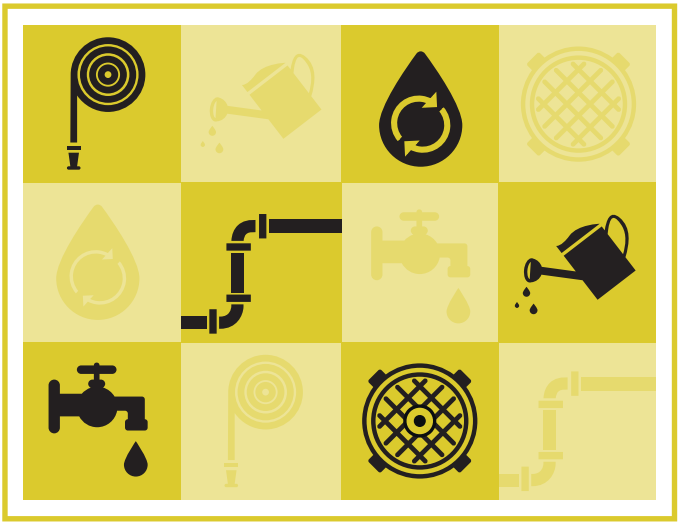
g- Sanitary load allocation and estimation;

h- Model Management;

i- Storm water load allocation and estimation.

2 Elements (pipes, manholes, etc.).

3 Characteristics (GRP, RC, uPVC, etc...) of the sewerage network.



Wastewater treatment plant required information:

1 Characteristics of the wastewater (chemical, physical and biological parameters).

N.B. For industries, it is crucial to know whether the wastewater contains trace elements (Aluminium (Al), Beryllium (Be), Cobalt (Co), Fluoride (F), Iron (Fe), Lithium (Li), Manganese (Mn), Molybdenum (Mo), Selenium (Se), Tin (Sn), Titanium (Ti), Tungsten (W) and Vanadium (V)) and heavy metals (Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg) and Zinc (Zn)). These elements can cause health hazards when water is taken up by the plant. In addition, industrial wastewater might contain higher levels of other organic matter such as Detergents, pesticides, fat, oil and grease, coloring, solvents, phenols, cyanide, thus a proper treatment is required prior the discharge of the effluent water.

2 Detailed technical description of the wastewater treatment plant sizing, capacity, its components and processes (preliminary, primary, secondary tertiary treatments, disinfection, effluent storage).

3 Characteristics of effluent water (chemical, physical and biological parameters).

N.B. This should be in compliance with Decision 52/1 and its amendment 8/1 regarding standards of water. (Decisions attached in Annex).

4 Energy required for WWTP.

5 Sludge treatment and final use.

6 Final use of effluent water.

7 Plant Design (drawings, schemes, photos etc.).

8 Maintenance and monitoring Plan: Laboratory tests conducted, water quality measurements.

9 Operational cost of WWTP.

N.B: In the characteristics of wastewater and effluent water, the parameters are the following:

a- Physical Properties: Alkalinity, Total Suspended Solids, Total Dissolved Solids, BOD5, COD, pH.

b- Chemical proprieties: Ammonia NH4, Chlorides, Nitrates, Nitrites, Phosphates, Sulfates, Total Nitrogen, Total Organic Carbon.

c- Biological proprieties: Fecal coliform, possible viruses and protozoa.